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ABSTRACT

While most associate in arts (AA) graduates who transfer to the Florida State University System (SUS) achieve satisfactory grade point averages, some do not. For Miami-Dade Community College (M-DCC) graduates, over 22% of the students in some disciplines have achieved grade point averages (GPA's) under 2.0. For the disciplines of Business/Management, Computer Sciences, and Engineering, which make up over 40% of M-DCC's annual graduations, the failure rate of transfers averaged 15% for the past several years. A study was conducted of 564 AA graduates who were attending 1 of 5 SUS campuses in fall 1988 and who were studying Business/Management, Computer Sciences, or Engineering. The study found that: (1) university GPA was best predicted by a combination of five variables (i.e., M-DCC GPA, College Level Academic Skills Test (CLAST) math scores, SUS credits earned, critical M-DCC major course credits earned, and the quality points of these major credits); (2) the variability of the cumulative university GPA was explained to the greatest extent by M-DCC GPA, and to a lesser extent by CLAST math score; (3) 83% of the failures at the university had overall M-DCC GPA's of less than 3.0; (4) 81% of those with high (3.5+) university GPA's also had high M-DCC GPA's; (5) 63% of the A.A. graduates kept the same major in the upper division; and (6) based on their course-taking behavior, students could be categorized as high requisite, high prerequisite, sampler, or marginal types, with only the first group performing well in the SUS. (AC)

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INDICATORS OF SUCCESS FOR UNIVERSITY TRANSFER OF MIAMI-DADE COMMUNITY COLLEGE GRADUATES IN BUSINESS/MANAGEMENT, COMPUTER SCIENCES AND ENGINEERING

Research Report No. 93-03R

February 1993

Institutional Research

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Miami-Dade Community College

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Research Report No. 93-03R

February 1993

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Highlights

This research report summarizes some of the findings from the author's dissertation. While most A.A. graduates who transfer to the Florida State University System achieve satisfactory grade point averages, some do not. At M-DCC, these rates have exceeded 22% in some disciplines. For the SUS disciplines of Business/Management, Computer Sciences, and Engineering disciplines, the failure rate (GPAs under 2.0) averaged 15% for the past several years. These three disciplines at Miami-Dade make up 44%-48% of annual graduations.

The cohort that was studied (N=564) consisted of Associate in Arts graduates attending FIU, FAU, UF, USF, and FSU in Fall Term 1988 who were in the Business Management, Computer Sciences, and Engineering disciplines at the SUS. Some findings follow:

Predicting SUS GPA

* University GPA (R^2=.418) was best predicted by a combination of five variables - Miami-Dade Community College GPA, CLAST Math test scale score, SUS credits earned, critical M-DCC major course credits earned, and the quality points of these major credits.

* The variability of the cumulative university GPA is explained to the greatest extent by the M-DCC GPA (nearly 36%).

* The second largest contributor to the variance in the regression model after M-DCC GPA is the scale score on the CLAST Mathematics test. This variable was a distant second, however, accounting for only 3% of variability when redundancy was removed.

* When considered by itself, ethnicity was a significant predictor of university GPA.

* 83% of the failures at the university for this cohort had overall M-DCC GPAs of less than 3.0; 77% of those who were failing at the university had M-DCC major course GPAs of less than 3.0.

* 81% of those with high (3.5+) university grade point averages also had high M-DCC grade point averages.

Curriculum and the Major

- Sixty-three percent of the A.A. graduates in the cohort continued the same major in the upper division.
- By the junior year, universities expect at least 18 earned credits in the major; 41% of M-DCC A.A. graduates who transferred did not have these credits.
- Students who performed well at the university took many critical courses in their major and did well in them.
- Based on their course-taking behavior, students could be categorized as high requisite type, high prerequisite type, sampler type, or marginal type; only the first group performed well in the SUS.

Cautions in Interpreting Findings

- The State University System utilizes a formula for calculating the GPA of A.A. graduates in the university's upper division that includes only SUS performance. This differential can distort interpretation of State published data aggregations when community college performance is compared to university native student performance, since community college transfers have many fewer credits in the SUS.
- Transfer students who earned no university credits and those with zero GPAs are deleted from State report data aggregations sent to the colleges by State agencies; these deleted student data may represent more serious cases of transfer difficulties.
- The prior quality point of courses repeated at M-DCC are not used in the calculation of cumulative grade point average. This practice tends to elevate the students' overall community college GPA.
- The university GPA in the scientific-technical disciplines may be influenced by the absence of "moderating" General Education courses for A.A. transfers in the upper division.

Indicators of Success for University Transfer of Miami-Dade Community College Associate in Arts Graduates in Business Management, Computer Sciences, and Engineering

Overview

Statewide Problem

This research report summarizes some of the findings from the author's dissertation. In the state community colleges of Florida, large numbers of Associate in Arts graduates in any given year are concentrated in a few of the community college's programs (Business/Management, Computer Sciences, and Engineering). Many of the graduates in these disciplines successfully attain a baccalaureate degree in senior institutions, and many are successful in persisting with a GPA of 2.0 or above. Nevertheless, overall in Fall Term 1988, 10%-15% of these A.A. graduates did not achieve a State University System (SUS) GPA that was high enough to allow them to acquire a baccalaureate degree (Division of Community Colleges, 1986, 1987, 1988, 1989). In some disciplines, the failure rates were even higher. For example, the failure rate in both the Physical Science and Life Science disciplines was over 16%. In a few areas (Forestry and Unclassified) the failure rate was beyond 22% for Associate in Arts graduates transferring to public universities. Consistently over the past several years in most disciplines, A.A. graduates transferring to the SUS showed failure rates in excess of the failure rates of SUS native students.

Rationale

In 1988-1989, 57% of the SUS upper division consisted of transfer students who received the Associate in Arts degree from Florida community colleges (Florida State Board of Community Colleges, 1990). If those community college students who transferred without the associate degree were also counted, community college transferees in the SUS would account for 77% of the upper division enrollments in the Florida state public universities (Belcher & Baldwin, 1991). This reality is steadily transforming the student demographics at the universities, rendering the traditional definition of university student less useful.

It may be assumed that after the numerous community college demands have been successfully met, the academic qualities needed to pursue studies leading to a baccalaureate degree have been met. But this has not necessarily been the rule. Of concern to M-DCC personnel are the failure rates in the SUS among M-DCC A.A. graduates. Many of those who failed at the university are majors in M-DCC's principal programs (Business Administration, Computer Sciences, and Engineering). As a result of these statistics on performance, the College's Academic Affairs Committee and the Office of the Vice President for Education indicated the need for detailed and precise information on student academic results in the State University System.

The three disciplines of Engineering, Computer Sciences, and Business Administration comprise the College's major programs in terms of size of enrollments and graduations. Together the Business/Management, Computer Sciences, and Engineering disciplines account for between 44% to 48% of the College's annual completions (see Table 1). The balance of graduations are due to the College's other 61 A.A. programs. The enrollments for these three programs are the largest in the Florida State University System. Nationwide, these disciplines are the most favored by undergraduate students.

Table 1

Associate in Arts Graduates in Selected Disciplines
Compared to Total Graduations at
Miami-Dade Community College
1987-1989

	Year					
	1987		1988		1989	
Discipline	Number	Percent	Number	Percent	Number	Percent
Business/Management	858	31	813	30	1,059	32
Computer Sciences	256	9	192	7	201	6
Engineering	210	8	200	7	245	7
Total 3 Disc (10 programs)	1,324	48	1,205	44	1,505	45
Other Disc (61 programs)	1,457	52	1,533	56	1,806	55
Total All Graduates	2,781	100	2,738	100	3,311	100

Source: Placement and Follow-up AA-1A for 1987, 1988, 1989.

What is occurring at M-DCC regarding the differential failure percent of A.A. degree transferees compared to university native students is true throughout the higher education

system of the State. To identify the behaviors and variables that contribute to transfer performance helps M-DCC and other public State higher education institutions to design policy and practice more conducive to transfer student success.

Research Questions

Three research questions are the focus of this study.

Research Question 1: What predicts success in the State University System for the Engineering, Computer Sciences, and Business Management disciplines?

Research Question 2: Are there differences in State University System GPA by gender, ethnicity, or age?

Research Question 3: Are there community college curriculum variables that relate to upper division performance?

Methodology

Two sets of transcripts for each individual in the study were drawn for analyses, the M-DCC transcript and the corresponding student's university transcript. A total of 1,128 transcripts were studied. Approximately 63 variables were examined and coded for electronic processing. Some of the variables were used for file merging, some provided demographic information, some for cross-validation purposes, and the remaining were necessary for scrutinizing the issues of the study. Variables were analyzed using the General Linear Model and Stepwise Regression. Descriptive statistics were generated on variables, and inferential data were used to verify qualitative input.

The M-DCC A.A. degree transfer sample studied included those in the Engineering, Computer Sciences, and Business Management disciplines. The selection criteria included State universities enrolling more than 20 M-DCC A.A. graduates (regardless of graduation year) in these disciplines. Universities identified were Florida International University, University of Florida, Florida State University, Florida Atlantic University, and the University of South Florida. The sample was selected from M-DCC A.A. graduates attending the SUS in the Fall Term of 1988-89.

The qualifying Fall Term 1988 cohort was divided into three groups. Low achievers had a GPA of less than 2.00, middle achievers a 2.00-3.49 GPA, and high achievers were in the 3.50+ GPA group. Of the three groups studied, two groups (high and low achievers) were studied in totality, and the third group (middle achievers) was a systematic sample. This latter group was a 12% systematic sample of every 8th qualified graduate whose record was in the SUS Student Course File. There were 564 subjects in the study. Table 2 gives the specific number and percent of subjects in the study for each of the three disciplines by achiever group. There were 21% (n=117) high achievers and 44% (n=247) low achievers. These two groups included everyone meeting the criteria noted previously. The middle achiever group consisted of 35% (n=200) of the total number of transcripts studied. Both university and community college transcripts of each member of the three achiever groups for each of the three disciplines were scrutinized for a multitude of behaviors.

Table 2

Cohort Sample of A.A. Graduates from Miami-Dade Community College in the SUS* in Fall Term 1988-89 for Business/Management, Computer Sciences, and Engineering

	Discipline (Disc)							
	Business/ Management		Computer Sciences		Engineering Sciences		Total	
Achiever (Ach) Group	No.	% of Disc.	No.	% of Disc.	No.	% of Disc.	No.	% of Disc.
High Achiever (> 3.5 GPA)	74	21	14	16	29	25	117	21
Middle Achiever (2.0-3.4 GPA)	128	35	32	36	40	35	200**	35
Low Achiever (< 2.0 GPA)	159	44	43	48	45	40	247	44
Total	361	100	89	100	114	100	564	100

* FIU, UF, FSU, FAU, USF; N>20 in discipline.
**12% systematic sample from a total of 1,653 middle achievers.

The predictor variables with attendant descriptive statistical support are presented in Appendix B. The General Linear Model was a first approach to determine the

significance of the model contribution of the independent variables to the explanation of the variance of university performance as measured by GPA (dependent variable). All twenty-five apparently relevant independent variables were structured into the exploratory model; the multiple regression R-square was .529. The variables included in the full model were CLAST Reading, Writing, and Math scale scores; total M-DCC credits earned; M-DCC GPA; M-DCC GPA in the critical major courses; credits earned in the supportive major courses; quality points in the supportive major courses; M-DCC GPA in the suggested major courses; credits earned in the suggested major courses; M-DCC GPA in related courses; credits earned in related courses; quality points in related courses; SUS credits earned; SUS credits attempted; ethnicity; age; and gender. Three interaction effects built into the model were ethnicity by M-DCC GPA, ethnicity by critical major GPA, and ethnicity by Math CLAST scale score.

Five variables from the exploratory procedure indicated significance. Further testing for verification followed. In order to determine if a smaller number of independent variables would explain a significant amount of variability of the SUS upper division GPAs, a Stepwise Regression procedure was applied to the prediction of SUS GPA. In this procedure, the first variable entered had the most significant correlation with the dependent variable. All other variables entered and accepted in the model passed the test of probability significance after redundancy was removed.

Results

Question 1 - What predicts success in the State University System for the Engineering, Computer Sciences, and Business/Management disciplines?

Table 3 contains the results for the Stepwise model. The overall model was significant ($F=39.8$, $p<.0001$) with the independent variables explaining 41.8% of the variability of the cumulative university GPA. For each independent variable, the partial R-square is given after the variables above it are entered into the model.

The variability of the cumulative university GPA (CGPASUS) is explained to the greatest extent by the M-DCC GPA (36%). The second largest contributor to the variance in the model after M-DCC GPA is the scaled score on the CLAST Math test (2.7%). Other variables significant at a .05 level are number of SUS Credits Earned, number of Tier1 Credits Earned (critical required major course credits earned at the community college), and the magnitude of the Tier1 Quality Points used in the calculation of the GPA.

Table 3

Prediction of University Grade Point Average
Stepwise Regression
Combined Disciplines of the Cohort
Miami-Dade Community College

Dependent Variable: Cumulative University GPA

Source	DF	SS	MS	F	Probability	R^2
Model	8	1551370	193921	39.8	0.0001	.4184
Error	443	2156143	4867			
Total	451	3707513				

Variable	B	Partial R^2	Model R^2	F	Prob
M-DCC GPA	69.64	0.3592	.3592	252.1	0.0001
CLAST Math	0.36	0.0269	.3861	19.6	0.0001
SUS Credits Earned	0.59	0.0125	.3985	9.2	0.0024
Tier1 Credits Earned	2.27	0.0104	.4089	4.8	0.0276
Tier1 Quality Points	1.02	0.0094	.4184	4.7	0.0293

Table 4 gives the correlation matrix for the predictor variables used in the multiple regression analysis. All correlations were significant at the .05 level except correlations between Tier1 Credits earned with SUS Credits Earned and Tier1 Quality Points with SUS Credits Earned. As expected, the high correlation (.89) between Tier1 Credits Earned and Tier1 Quality Points exists because they are both essential in GPA calculations. The relatively high correlation between CLAST Math and M-DCC Grade Point Average is accounted for by the fact that the disciplines for the cohort have a greater mathematics orientation than many other disciplines. Because Tier1 Quality Points are used in total M-DCC cumulative GPA calculation, it is not surprising to see a correlation of .41.

Table 4

Predictor Variables:
Correlations Among Variables Used in
Stepwise Regression

Variable	SUS GPA	MDCC GPA	CLAST Math	SUS Earned	TIER1 Earned	TIER1 Points
SUS GPA	--	--	--	--	--	--
M-DCC GPA	.57*	--	--	--	--	--
CLAST Math	.42*	.47*	--	--	--	--
SUS Earned Credits	.21*	.13*	.14*	--	--	--
Tier1 Earned Credits	.12*	.09*	.15*	.01	--	--
Tier1 Qual Points	.32*	.41*	.30	.03	.89*	.89

*Statistically significant at the .05 level.

Table 5 displays the statistics obtained during the model building stage. While only five variables qualified for the model, statistics for other variables tested during model building are a record of M-DCC student behaviors and accomplishments. They also provide a summary of the diversity of M-DCC Associate in Arts graduates attending Florida state universities.

The range of performance outcomes within variables and across variables is wide, indeed. For a number of variables, the range is as broad as it could possibly be. For example, the quality points of the critical major courses (Tier1QP) ranged from a low of 3 to a high of 216. SUS cumulative Grade Point Average spanned from .25 to 4.0. Wide variability is evident for all measures used for the analysis. M-DCC Grade Point Averages were spread from 2.00 to 4.00. Scaled CLAST Math score differences between minimum and maximum equalled 102 points. Assuming the three credit mode per course for SUS Credits Earned, individuals in the cohort ranged from one course to forty-nine courses.

Table 5

Univariate Statistics for Potential Predictors
Combined Disciplines of the Cohort
Miami-Dade Community College

Variable	Mean	SD	Range
M-DCC GPA	2.8	0.4	2-4
Total M-DCC Credits	77.0	15.4	61-161
Tier1 No. Courses	6.3	3.2	1-19
Tier1 Credits	28.0	9.0	3-84
Tier1 Quality Points	59.5	29.8	3-216
Tier1 GPA	2.8	0.7	1.1-4.0
Tier2 Credits	705.0	13.8	1-253
Tier2 Quality Points	19.9	12.5	3-96
CLAST Math	318.0	29.6	230-432
CLAST Reading	306.5	27.8	233-432
CLAST Writing	310.0	39.5	243-401
SUS Credits Attempted	36.0	24.4	3-148
SUS Credits Earned	27.8	20.1	3-131
SUS Cumulative GPA	2.3	0.8	.25-4.0

Question 2 - Are there differences in State University System GPA by gender, ethnicity or age?

Although the demographic variables of ethnicity, gender, and age were found to be not significant in predicting SUS GPA when included with the full model (see page 5 and Appendix B), it was felt that ethnicity merited separate attention. Corroborative reports found in the literature identify ethnicity as generally predictive of GPA; in a report issued by Morris and Belcher (1990), minority status was a significant predictor variable for CLAST outcome measures among Florida community colleges. In this State University System GPA study, results indicated that ethnicity, but not gender or age, were significant (see Table 6).

Table 6

Age, Gender, and Ethnicity Results
Regressing on University GPA

Variable	DF	F Value	Pr > F
Gender	1	1.01	0.3050
Age	1	0.58	0.4463
Ethnic - Black	1	82.09	0.0001
Ethnic - White	1	452.19	0.0001
Ethnic - Hispanic	1	928.46	0.0000
Overall Ethnic	3	680.41	0.0100

The distribution of university GPA by ethnic group for the cohort is the subject of Table 7. Of the 147 White students in the cohort, 51 or 35% were in the high GPA group. Comparing across ethnic groups, 44% of those in the high GPA group were White students. Within ethnic group comparison indicated that the low GPA group shows a disproportionate percent of Black students--71% or 32 of the total of 45 Black students in the cohort. Transcript analysis revealed that many of those in the low SUS group had not taken sufficient university requirements for their transfer major.

Table 7

University Grade Point Average by Ethnic Group
Cohort of Miami-Dade Associate in Arts Graduates
Transfer to Major Florida State Universities
Fall Term 1988

	SUS Grade Point Average							
	Less Than 2.0		2.0 Through 3.4		3.5 or Better		Ethnic Total	
Ethnic Group	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Black	32	71	9	20	4	9	45	100
White	46	31	50	34	51	35	147	100
Hispanic	158	45	132	38	58	17	348	100
Other	11	46	9	37	4	17	24	100
GPA Total	247	-	200	-	117	-	564	-

Question 3 - Are there community college curriculum/GPA variables that relate to upper division performance?

Table 8 gives the shifts of majors of the M-DCC cohort as they transferred to State universities. Sixty-three percent of the cohort retained their M-DCC major in the SUS. Increases in SUS major for Business/Management and Engineering were due to shifts in major from the "Other" and "Undecided" categories. The decrease in M-DCC Computer Sciences major was due to shifts primarily to Business and, secondarily, to Engineering. Not shown in this particular table is the cluster of Engineering foundational courses taken by some students in the "Other" category, which helped them to fulfill the university requisites for Engineering. These latter students were largely in M-DCC science programs

and their chemistry, physics, and mathematics courses overlapped with the Engineering curriculum.

Table 8

Cohort Program of Major at M-DCC for
Miami-Dade Associate in Arts Graduates Transferring to
Selected Florida State Universities
Fall Term 1988

	M-DCC Major		SUS Major	
Discipline	Number	Percent	Number	Percent
Business/Management	290	51.4	361	64.0
Computer Sciences	102	18.1	89	15.8
Engineering	80	14.2	114	20.2
Other	57	10.1	-	-
Undecided	35	6.2	-	-
Total	564	100.0	564	100.0

How well do the Miami-Dade students comply with the recommendations of the universities while at Miami-Dade? The statistics for the course-taking patterns of the cohort under scrutiny are found in Table 9. For the Tier1 courses (critical for the major), 18% of the cohort took one or two courses and 23% took three to five courses....giving a total of 41% taking less than six Tier1 courses. The highest percent (34%) took six to eight courses. A quarter of these students completed 9-13+ major courses at M-DCC. In comparison, university native students are commonly required to take a minimum of 6 major courses - 18 major credits - during their freshman/sophomore years (The University of Florida, 1989). If community college graduates were held to this latter standard, 41% of this cohort of community college graduates would be out of compliance. There is a discrepancy between the number of recommended major courses actually taken by students and the number of major courses recommended by the universities.

Table 9

Number of Courses Completed by Cohort for the University Curriculum Recommended for Associate in Arts Graduates Transferring to the State University System from Miami-Dade Community College in Fall 1988

	Tier1 Critical		Tier2 Supportive		Tier3 Suggested		Tier4 Related	
Taken	No.	%	No.	%	No.	%	No.	%
1-2	102	18	423	75	523	93	458	81
3-5	133	23	135	24	36	6	94	17
6-8	192	34	4	1	0	0	6	1
9-12	121	22	2	0	4	1	6	1
13 +	16	3	0	0	1	0	0	0
Total	564	100	564	100	564	100	564	100

Are M-DCC A.A. graduates failing at the universities because they barely met minimal GPA standards for graduation from community colleges? Table 10 compares the M-DCC GPAs with the upper division SUS GPAs of the cohort. Of the M-DCC graduates with a cumulative GPA of 2.0-2.4, 73% have unacceptable university GPAs (71 of 97). Of the A.A. transfers with a 2.5-2.9 M-DCC GPA, 57% (n=134) of them had less than a 2.0 cumulative university GPA. Together the data for M-DCC graduates with less than a 3.0 GPA account for 205 or 83% of the failures at the university for this cohort. On the other hand, 81% or 120 of 148 students with M-DCC GPAs of 3.0 or better had SUS GPAs of 3.0 or better.

Table 10

M-DCC and Upper Division Grade Point Average Of Miami-Dade Community College Associate in Arts Graduates Attending Major Florida State Universities Fall Term 1988

	University Grade Point Average											
	<2.0		2.0-2.4		2.5-2.9		3.0-3.4		3.5+		Total	
M-DCC GPA	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
2.0-2.4	71	73	16	17	3	3	1	1	6	6	97	100
2.5-2.9	134	57	49	21	30	13	5	2	16	7	234	100
3.0-3.4	35	23	28	19	29	19	16	11	41	28	149	100
3.5+	7	8	8	10	6	7	9	11	54	64	84	100

How well did this cohort perform in their critical major courses while attending M-DCC? Table 11 presents the GPA for critical credits earned at M-DCC for each discipline in the study. Most students with zero critical credits had changed their majors. Substantial percentages of students attained marginal critical course GPAs (less than 2.4): 44% for Engineering, 25% for Business/Management, and 20% for Computer Sciences. Students who took greater numbers of critical credits had higher GPAs. Computer Sciences students took far fewer critical credits than the other groups. These data confirm observations made during transcript coding that students who fail at the university tended to graduate from Miami-Dade with a marginal overall GPA and a slightly lower GPA in their major field than their overall GPA.

Table 11

Grade Point Average For Critical Credits Taken at Miami-Dade Community College for Specific Disciplines Cohort A.A. Graduates Transferring to the SUS

Critical Credits	Critical (Tier1) Courses GPA								Total	
	<2.0		2.0-2.4		2.5-3.4		3.5+			
	No.	%	No.	%	No.	%	No.	%	No.	%
Business/Management										
0-6	13	45	11	18	19	10	12	15	55	15
7-15	5	17	12	20	37	19	13	17	67	19
16-28+	11	38	38	62	137	71	53	68	239	66
Total	29	100	61	100	193	100	78	100	361	100
Computer Sciences										
0-6	4	57	4	36	5	12	3	10	16	18
7-15	3	43	7	64	22	55	20	65	52	58
16-28+	0	0	0	0	13	33	8	25	21	24
Total	7	100	11	100	40	100	31	100	89	100
Engineering										
0-6	13	52	1	4	4	8	0	0	18	15
7-15	2	8	7	27	8	17	3	17	20	17
16-28+	10	40	18	69	36	75	15	83	79	68
Total	25	100	26	100	48	100	18	100	117	100

How did students with inadequate or barely adequate grade point averages in their critical major M-DCC courses perform in their major at the university? Table 12 answers this question. Of those with SUS GPAs less than 2.0, 44% had M-DCC major GPAs of 2.4 or less. By comparison, only 9% of students with SUS GPAs of 3.5 or higher had M-DCC

GPAs below 2.5. In all, 77% (191 of 247) of the students who were not doing well in the SUS had critical major course GPAs of less than 3.0.

Table 12

GPA for Credits Earned in Critical Courses Taken at Miami-Dade Community College and University GPA

	Miami-Dade Community College Critical Courses GPA											
	<2.0		2.0-2.4		2.5-2.9		3.0-3.4		3.5+		Total	
SUS GPA	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<2.0	41	17	67	27	83	34	37	15	19	7	247	100
2.0-3.4	12	6	38	19	50	25	60	30	40	20	200	100
3.5+	5	4	6	5	13	11	25	22	68	58	117	100

During the transcript analysis process, other impressions were gleaned. Students tended to fall into one of four categories regarding enrollment in major courses at M-DCC. The four types are described below:

High Requisite Type. Students who took many of the courses recommended by the universities for their major and did well in these courses, tended to succeed in the SUS. They were apparently goal-oriented and began taking major courses early in their college careers. Though some of them may have changed majors, changes of major often occurred in fields having a heavy overlap of major requirements and this enabled success in spite of the switch. These students had strong mathematics backgrounds. They understood their capabilities and took only as many courses as they could handle. They tended to fulfill minimum Associate in Arts degree graduation requirements; most remaining courses were dedicated to strengthening their majors. Often the number of credits taken in the major pushed the cumulative credits far beyond the minimum needed to graduate.

High Prerequisite Type. Students began college with academic deficits in basic academic skills and/or needed many prerequisites in order to take requisite courses. This prerequisite to requisite deficit was evident in the mathematics segments of the Computer

Sciences and Business Administration programs. But the deficit was most apparent for the engineering specialties where many foundational mathematics courses are required preliminary to university required mathematics, chemistry, and physics courses.

In disciplines which are highly structured and sequential, quality performance in the initial major courses is necessary for providing the bedrock of knowledge and skills for success in subsequent course work. Often at the time of graduation, only a few SUS major requirements had been taken. These students tended not to perform well in the SUS for the disciplines noted.

Sampler Type. Students appeared undecided about their area of subject concentration and so sampled courses in an attempt to find some focus. When they were eligible to graduate, few major courses had been taken. A major may have been declared, but transcripts revealed that courses completed provided a liberal background with no subject concentration. These students tended to do poorly in the SUS for technically/scientifically oriented studies.

Marginal Type. Students struggled through their major courses, often failing them and repeating them, sometimes more than once or twice. Their final grade for the course repeated may have been a "C". Cumulative GPA for the major may have been marginal (low "C") and the overall GPA may have been somewhat higher than their major GPA, but just barely high enough to meet minimum GPA standards for graduation. Their performance level for the major courses at M-DCC did not establish the necessary basis for success in the SUS in these disciplines.

The impressions gathered in the analysis of transcripts were in concordance with the statistical data produced.

Summary

Five variables predicted the variability of the university GPA. In the order of the size of their contribution to the explanation, they were M-DCC GPA, CLAST Math scale score, SUS credits earned, number of critical course credits earned at Miami-Dade, and the quality points of these critical courses. When treated separately, ethnicity was a significant predictor.

Seventy-seven percent of the students in the cohort who failed at the university had an M-DCC GPA in their major of less than 3.0 and 83% of those failing at the university had an overall M-DCC GPA of less than 3.0. In contrast, 81% of those with high university grade point averages also had high M-DCC grade point averages. Students who took many critical courses in their major program at the community college and did well in them, also performed successfully at the university.

Discussion

A factor that influences the outcomes of the GPA is the methodology involved in its computation. The State University System utilizes two different formulae to calculate the GPA of the student in the university's upper division. These formulae consist of eliminating from GPA calculations at the university all previously earned credits for transfer students, but for university native students, including all credits earned for GPA calculations. Setting the transfer student's GPA to zero in calculating cumulative GPA in the upper division can have adverse effects on the transferee. The "risk factor" is increased should a student do poorly in a course or two soon after transfer. But for the university native, junior year GPAs are not only devoid of the transfer shock phenomenon, but more advantageously, at least two years worth of quality points have already been accumulated to dissipate the effects of poor course grades in the upper division.

On the other hand, the community college cumulative GPA is boosted by the nature of its "forgiveness policy". This policy eliminates prior points earned for course(s) repeats

in GPA calculation. In effect, the student is helped through the system and in admittance to transfer institutions and/or programs. On the negative side, this policy may contribute to GPA inflation.

Another factor that increases the risk for A.A. graduates transferring to the SUS regards an articulation agreement. The protection accorded the General Education courses for A.A. graduates from "retakes" at the university allows students to fully target upper division courses. A disadvantage attends this protection. University native students are able to balance difficult courses in the upper division with some of the more pleasurable General Education courses. Associate in Arts graduates do not have this advantage; a full load of major courses in the scientific-technical disciplines, with no moderators may result in lower GPAs for these transfer students.

Though multiple regression analysis identified ethnicity as significant in accounting for the variability of the university grade point average, the differences among the ethnic groups may not have been due to ethnicity *per se*, but to specific community college behaviors of the students. Academic behaviors such as compliance with university major course requirements and grades earned in critical major courses tend to influence subsequent course performance outcomes, regardless of the ethnicity of the student. Future studies should confirm whether this is the case.

Those most likely to do well at the university may have built the foundations for their success while studying at M-DCC, and not unreasonably, in their pre-collegiate curriculum. A marginal major field GPA at M-DCC hardly sets a proper foundation for excellence in any field of endeavor. Students may also be eligible to graduate with an A.A. degree before completing the prerequisites to the university requisites, and without taking university requisites for the major.

Findings suggest possibilities for reviewing curricular expectations, curricular sequencing, course standards, grading practices, academic support services, articulation

effort intensification, articulation extension and/or course leveling issue resolution. Some questions arising from this study are:

1) Are students transferring to the university placed in academic jeopardy because of the method used to calculate their university GPAs?

2) What would facilitate equitability for GPA calculation comparisons between community college A.A. graduates transferring to State universities and university native students?

3) Should the broad spectrum of university recommended major courses--as currently noted in the program curriculum sheets and AGIS--be specifically categorized and sequenced for some disciplines? Would this eliminate the plethora of perplexing choices and would the prescriptiveness help students to focus efforts?

4) Would a system for monitoring major discipline courses actually taken at M-DCC better prepare students for the rigors of specialization at the university? What attendant issues require resolution and what resources are required for the implementation of a major course monitoring system?

5) With the knowledge that goal-oriented students take many courses in the program of their major and subsequently perform well at the university, what measures can be taken to promote "goal-centeredness"?

6) Should a higher minimum grade standard be imposed for performance in the major field courses? What computer resources would this entail?

7) Should Articulation Agreements be extended to protect major discipline courses for Associate in Arts graduates? What are the attendant ramifications and issues to this extension?

The failure rate may well be indicative of problems entrenched in our community that preceded collegiate training by many years. These problems need to be dealt with if the cycle of unpreparedness is to be broken.

APPENDIX A

Criteria for Tier Classification

The curricula for university required/recommended courses for the Business/ Management, Computer Sciences, and Engineering disciplines are numerous. Because there are far more courses required than the most diligent and self-sacrificing of students could reasonably complete, the layering of courses into tiers was imperative. This "tiering" revealed the extent to which particular courses were vital to successful student performance at the university. The courses that were required overlapped across universities. At the same time, there were courses that were uniquely required by just one or two of the universities. Hence, it became incumbent to establish criteria for the placement of these multitude of courses into tiers. The criteria for classifying the four tiers of courses required or suggested for community college students by the universities follow:

TIER1 - Required[1]: Critical to Success

1) Recommended by multiple and/or primary[2] universities.
2) Required across subdisciplines of major.
3) Reasonable to background, core, skills of discipline.

TIER2 - Required: Supportive of Success

1) Not recommended by primary or many universities.
2) Appear peripheral to success in discipline at the community college level.

TIER3 - Suggested by Universities

1) Scattered/few universities agreed on inclusion in the curriculum.
2) Appear marginal to focus of discipline.

TIER4 - Related to Discipline

1) Not required as critical or not critical *per se*.
2) Not suggested.
3) Content in someway(s) connected to the major field.
4) May be prerequisite to requisite.
5) May be advanced courses---beyond requirements.

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[1]Universities differ in their judgment regarding the courses that are important for preparation in the upper division major.

[2]Primary universities are those to which large numbers of M-DCC graduates transfer (FIU, FSU, UF, FAU, USF).

APPENDIX B

Variable Definitions

AGE	Year of birth of the graduate
CCLAST	CLAST Mathematics
CGPASUS	Cumulative Grade Point Average at the State University System (Y1 dependent variable)
GENDER	Male or female
MDCGPA	Miami-Dade Community College Cumulative Grade Point Average
RACE[3]	Ethnic group membership
RCLAST	CLAST Reading
WCLAST	CLAST Writing
SUSATMPT	Number of university credits attempted
SUSEARN	Number of university credits earned
TIER1GPA	GPA for TIER1 courses
TIER1CR	Number of TIER1 credits
TIER1QP	TIER1 cumulative quality points
TIER2GPA	GPA for the TIER2 courses
TIER2CR	Number of TIER2 credits
TIER2QP	TIER2 cumulative quality points
TIER3GPA	GPA for TIER3 courses
TIER3CR	Number of TIER3 credits
TIER3QP	TIER3 quality points
TIER4GPA	GPA for TIER4 courses
TIER4CR	Number of TIER4 credits
TIER4QP	TIER4 quality points
TOTCRDIT	Cumulative credits earned at M-DCC

[3]Race by other variables measured effects significance.

APPENDIX C

University Curriculum Recommended for the
Associate in Arts Degree Transfers* for Selected
Disciplines by Course Categories (Critical, Supportive, Suggested)

ENGINEERING

No. Credits	Course	Course Title
		TIER1 (Critical Courses)
3	CHM 1040	General Chemistry
1	CHM 1040L	General Chemistry Laboratory
3	CHM 1041	General Chemistry
1	CHM 1041L	General Chemistry Laboratory
3	CHM 1046	General Chemistry/Qualitative Analysis
1	CHM 1046L	General Chemistry/Qualitative Analysis Lab
3	CHM 1050	General Chemistry/Qualitative Analysis
2	CHM 1050L	General Chemistry/Qualitative Analysis Lab
5	MAC 2311	Calculus & Analytic Geometry 1
5	MAC 2312	Calculus & Analytic Geometry 2
5	PHY 2040	Physics with Calculus
1	PHY 2040L	Physics with Calculus Laboratory
5	PHY 2041	Physics with Calculus
1	PHY 2041L	Physics with Calculus Laboratory
3	MAP 2302	Differential Equations

Total TIER1 = 42 credits for 15 major courses

		TIER2 (Supportive Courses)
3	CHM 1051	General Chemistry/Qualitative Analysis
2	CHM 1051L	General Chemistry/Qualitative Analysis Lab
4	COP 1110	Fortran/Applications
3	EGN 1001	Introduction to Engineering
5	EGN 1120C	Engineering Graphics
4	EGN 2311	Engineering Mechanics - Statics
4	EGN 2323	Engineering Mechanics - Dynamics
5	MAC 2313	Calculus & Analytic Geometry 3

Total TIER2 = 30 credits for 8 major courses
Total TIERS 1 & 2 = 72 credits for 23 major courses

*In effect 1986

APPENDIX C
(continued)

University Curriculum Recommended for the
Associate in Arts Degree Transfers for Selected
Disciplines by Course Categories (Critical, Supportive, Suggested)

ENGINEERING (continued)

No. Credits	Course	Course Title
		TIER3 (Suggested Courses)
3	ENC 1210	Technical Report Writing
4	SUR 1101C	Surveying 1 (B7 only)
3	APB 1150	General Education Biology
3	MAS 2103	Elementary Linear Algebra
3	ECO 2013	Principles of Economics - Macro
3	ECO 2023	Principles of Economics - Micro
4	EEL 2111C	Engineering Circuit Analysis
4	EGN 2333	Mechanics/Materials (B7 only)

Total TIER3 = 27 credits for 8 major courses
Total All TIERS = 99 credits for 31 major courses

C5 Industrial C6 Chemical C7 Engineering Science B7 Civil
B8 Mechanical B9 Electrical 25 Ocean Engineering

ARCHITECTURE (Engineering)

		TIER1 (Critical Courses)
3	ARC 1115	Architectural Communications 1
4	ARC 1126	Architectural Drawing 1
4	ARC 1312	Architectural Design 1
4	ARC 1314	Architectural Design 2
4	ARC 2461	Architectural Materials Construction 1
3	MAC 1114	Trigonometry
3	MAC 1140	Pre-Calculus Algebra
3	MAC 2233	Business Calculus
3	PHY 2053	Physics
1	PHY 2053L	Physics Laboratory

Total TIER1 = 32 credits for 10 major courses

APPENDIX C
(continued)

University Curriculum Recommended for the
Associate in Arts Degree Transfers for Selected
Disciplines by Course Categories (Critical, Supportive, Suggested)

ARCHITECTURE (continued)

No. Credits	Course	Course Title
		TIER2 (Supportive Courses)
4	ARC 2311	Architectural Design 3
4	ARC 2313	Architectural Design 4
4	ARC 2580	Architectural Structures 1
4	ARC 1471	Architectural Drawing 2
5	MAC 2311	Calculus & Analytic Geometry 1
3	APB 1150	General Education Biology
1	APB 1150L	General Education Biology Lab

Total TIER2 = 25 credits for 7 courses
Total TIERS 1 & 2 = 57 credits or 17 major courses

		TIER3 (Suggested Courses)
1	ARC 2052	Architectural Computer Techniques
4	ARC 2053	Architectural Computer Applications
2	ARC 2201	Theory of Architecture
3	ARC 2780	History of Architecture 1
3	ARC 2781	History of Architecture 2
4	CGS 1100	Introduction to Micro Usage
3	WOH 2012	History of World Civilization to 1715
3	WOH 2022	History of World Civilization from 1715

Total TIER3 = 23 credits for 8 major courses

***Total All TIERS = 80 credits or 25 major courses

APPENDIX C
(continued)

University Curriculum Recommended for the
Associate in Arts Degree Transfers for Selected
Disciplines by Course Categories (Critical, Supportive, Suggested)

COMPUTER SCIENCES/BUSINESS DATA PROCESSING

No. Credits	Course	Course Title
		TIER1 (Critical Courses)
5 Both	MAC 2311	Calculus & Analytic Geometry 1
5 Both	MAC 2312	Calculus & Analytic Geometry 2
5 CS	PHY 2040	Physics with Calculus
1 CS	PHY 2040L	Physics with Calculus Laboratory
5 CS	PHY 2041	Physics with Calculus
1 CS	PHY 2041L	Physics with Calculus Laboratory
4 Both	COP 1120	COBOL
4 BDP	COP 1170	Intro to Computer Programming/BASIC
4 BDP	COP 1200	Fortran/Applications
4 CS	COP 1210	Introduction to PASCAL
4 CS	COP 2211	Intermediate Programming/PASCAL
4 CS	COP 2401	Assembler Language
3 BDP	QMB 2100	Basic Business Statistics
3 Both	STA 2014	Statistical Methods
3 BDP	MAC 1102	College Algebra
3 BDP	MAC 2233	Business Calculus

Total TIER1 BDP = 34 credits for 9 major courses
Total TIER1 CS = 41 credits for 11 major courses

		TIER2 (Supportive Courses)
3 Both	ACG 2001	Principles of Accounting 1
3 Both	ACG 2011	Principles of Accounting 2
3 BDP	BUL 2111	Business Law 1
3 CS	MAP 2302	Introduction to Differential Equations
3 CS	MAS 2103	Elementary Linear Algebra

Total TIER2 BDP = 9 credits for 3 courses
Total TIER2 CS = 12 credits for 4 courses
Total TIERS1 & 2 BDP = 43 credits for 12 major courses
Total TIERS1 & 2 CS = 53 credits for 15 major courses

APPENDIX C
(continued)

University Curriculum Recommended for the
Associate in Arts Degree Transfers for Selected
Disciplines by Course Categories (Critical, Supportive, Suggested)

COMPUTER SCIENCES/BUSINESS DATA PROCESSING (continued)

No. Credits	Course	Course Title
		TIER3 (Suggested Courses)
4 Both	COP 2122	Advanced COBOL/On-Line Applications
3 CS	CHM 1040	General Chemistry
1 CS	CHM 1040L	General Chemistry Laboratory
4 BDP	COP 1340	Operating Systems OSJCL
4 BDP	CIS 1000	Introduction to Data Processing
4 Both	CGS 1100	Introduction to Micro Usage
3 Both	SPC 1022	Intro to Speech Communication
3 Both	ECO 2013	Principles Economics - Macro
3 Both	ECO 2023	Principles Economics - Micro

Total TIER3 BDP = 25 credits for 7 major courses
Total TIER3 CS = 21 credits for 6 major courses
Total All TIERS BDP = 68 credits for 19 major courses
Total All TIERS CS = 74 credits for 22 major courses

BUSINESS/MANAGEMENT

		TIER1 (Critical Course)
3	ACG 2001	Principles of Accounting 1
3	ACG 2011	Principles of Accounting 2
4	CGS 1100	Introduction to Micro Usage
4	CIS 1000	Introduction to Data Processing
4	COP 1170	Intro to Computer Programming/BASIC
3	ECO 2013	Principles of Economics - Macro
3	ECO 2023	Principles of Economics - Micro
3	MAC 1102	College Algebra
3	QMB 2100	Basic Business Statistics
3	STA 2014	Statistical Methods
3	MAC 2233	Business Calculus

Total TIER1 = 36 credits for 11 major courses

APPENDIX C
(continued)

University Curriculum Recommended for the
Associate in Arts Degree Transfers for Selected
Disciplines by Course Categories (Critical, Supportive, Suggested)

BUSINESS MANAGEMENT (continued)

No. Credits	Course	Course Title
		TIER2 (Supportive Courses)
3	BUL 2111	Business Law 1
1	CGS 1400	BASIC for Business Data Processing
3	MAC 1140	Pre-Calculus Algebra
5	MAC 2311	Calculus & Analytic Geometry 1
3	SPC 1022	Introduction to Speech Communication
3	GEB 1011	Principles of Business

Total TIER2 = 18 credits or 6 major courses
Total TIERS 1 & 2 = 54 credits or 17 courses

		TIER3 (Suggested Courses)
4	COP 1110	Fortran/Applications
3	PSY 2012	Introduction to Psychology
3	PHI 1100	Introduction to Logic

Total TIER3 = 10 credits for 3 major courses
Total All TIERS = 64 credits for 20 major courses

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Miami-Dade Community College

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